An Educational Blueprint for the Brown Medical School

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Preface

An Educational Blueprint for the Brown Medical School consists of three parts: the mission statement, Brown’s nine abilities, and the knowledge base. These documents, which are the end-products of an intensive planning process involving hundreds of faculty and students, represent the foundation of a competency-based curriculum for the medical school.

The rationale animating the competency-based curriculum stems from the need to define the outcomes of the educational process: what are the desirable qualities of a medical school graduate, and what constitutes the essential knowledge base that will enable a graduate to make a successful transition to his/her chosen medical field? The nine abilities and the knowledge base delineate these outcomes in concrete terms, whereas the mission statement expresses the collective vision of what motivates and unifies administration, faculty, and students.

Brown’s nine abilities encompass a broad range of expectations for future physicians, ranging from traditional clinical skills to the more elusive aspects of the art of medicine. Each of the abilities includes a list of specific criteria that the student is expected to master at a certain level of achievement, depending upon the student’s stage of professional development. The levels are the beginning or novice student, the intermediate student, and the advanced student; all students must attain the intermediate level of proficiency in all abilities before graduation. In addition, students will be expected to attain an advanced level of proficiency in a smaller subset of those nine abilities based upon their own interests.

The abilities draw upon the content of the knowledge base to create specific tasks for student learning and assessment. Table I illustrates the incorporation of two separate matrices within the knowledge base. The first matrix, Mechanisms of health and disease, focuses primarily on the sciences basic to medicine; the horizontal axis represents the levels of organization of the human organism, and the vertical axis represents structural and functional dimensions. The second matrix, Clinical approaches to health & disease, represents the relationship between the various stages of the human life cycle (the vertical axis) with the type of encounters between doctor and patient (the horizontal axis).

The knowledge base represents the combined efforts of nine faculty-student working groups, each group corresponding to an area on either the basic science or the clinical science matrix. Outlines produced by each group underwent two rounds of review (using the Delphi technique) by volunteer faculty members; items were rated on a scale ranging from essential to not at all important. The final database contains only those items (about three-quarters of the original items) receiving the ratings essential or very important by more than half of the participating faculty. Inclusion in the knowledge base signifies the importance of a topic; all graduates should be able to use knowledge about that topic proficiently. A topic’s exclusion from the knowledge base is not an indication of its irrelevance; rather, in planning the use of curriculum time, faculty assigned a higher priority to other topics that are in the knowledge base.

Many topics in the knowledge base intentionally permit wide latitude by the instructor in the selection of specific content with which to address the topic. For example, the knowledge base includes genetics under mechanisms of disease at the cellular and molecular level but does not specify which genetic diseases or genetic abnormalities must be used to illustrate the principles. Faculty should select specific content with these few provisos.

1. Content should be selected based on its teaching value according to
   • prevalence
   • importance
   • general applicability
   • particular illustrative value.

2. Content should be selected to present sufficient examples so as to make general principles clear.
   It is not desirable to present examples beyond that necessary to achieve this objective.

3. Content should be selected that is relevant to the practice of medicine.

Thus, the knowledge base represents the core content of our medical curriculum. All students will possess this core of knowledge upon graduation in addition to the knowledge gained by pursuing their own interests as well as being exposed to the wide variety of faculty interests.

This Educational Blueprint—mission statement, nine abilities, and knowledge base—represents a bold innovation in medical education. The process of defining the characteristics of the graduates of the Brown Medical School is only a first step. We must now embark on the challenging task of building the curriculum to produce these graduates.
I. Effective Communication

The competent graduate demonstrates effective verbal, nonverbal, and written communication skills in a wide range of medically related activities including patient care, consultation and collaboration with colleagues and coworkers, and teaching and/or presentations in the medical arena. The graduate demonstrates effective clinical communication skills necessary for the competent care of patients and their families including rapport-building, active/responsive listening, therapeutic relationship skills and patient education and counseling skills.

Criteria for Assessment

Communication skills being assessed must be defined in observable, identifiable, behavioral terms. Ideally, skills should be based on a theoretical model or a practical application relevant to medicine. Models can be derived from theory and research, or can be derived from widely accepted practice-based behaviors. For example, case presentations in problem-based learning can be structured to reflect case presentations residents prepare for attendings. The model used should be explicit and specifically defined in terms of its structure and component skills. Assessment should reflect the structure and skills in the model.

Clear applicability of skills to the roles and responsibilities of physicians and their practice should be presented. Linkages between key communication skills and professional responsibilities of physicians should be explicit. Goals and objectives for communication skills teaching and learning should be clearly stated and communicated effectively to students.

Specific communication skills should be assessed separately. Although an “overall impression” score may provide some insight into the performance of a student, in order for assessment to be more objective and meaningful, this overall impression must be coupled with specific feedback on individual skills.

Methods of assessment, how often student skills are assessed and the type of observation (taped, live observation, simulated interaction, group presentation, etc.) should be clearly defined and equally applied to all students.

1. Uses written language effectively

Employs skills for appropriate, comprehensible, organized and legible written communication for medical tasks including:

- written history and physical
- progress notes
- discharge summary
- discharge instructions
- prescriptions
- hospital orders
- inter-agency plan of care
- case report/poster/scientific article
- letters to patients and/or families
2. Uses verbal and nonverbal skills effectively

Uses verbal language effectively in a sensitive, comprehensible, organized and audience-appropriate manner. Employs effective nonverbal skills to convey appropriate effect and to facilitate an effective interaction. Skills may be demonstrated in the context of medical tasks including:

- doctor-patient interactions
  - history-taking and information gathering
  - screening and patient assessments
  - counseling, patient education and advising
  - communication during exam/diagnostic/treatment procedures
  - telephone communication
- communication with families
  - education, counseling and advising
  - negotiating/mediating family decision making
- communication with peers and colleagues
  - effective group participation and input
  - oral case presentations
  - “curb-side” and telephone consultation
  - interpersonal skills/effective collaboration
  - clinical team meetings

3. Employs effective listening skills

Uses active and responsive listening skills, accurately interpreting both verbal and nonverbal messages while facilitating effective communication. Skills may be demonstrated in tasks listed in #2 above.

4. Is sensitive and responsive to gender, ethnic, socioeconomic and other diversity in an individual’s background and/or life experience

Recognizes, respects and responds to influences in communication, meaning and beliefs regarding health and health care arising from patients’ and families’ individual and collective backgrounds. Important characteristics in an individual’s background include but not limited to: gender, age, sexual orientation, culture, socioeconomic status, race and ethnicity. Demonstrates self-awareness of one’s own culture and how it may influence or interfere with effective communication. Adjusts verbal and nonverbal approaches to enhance cross-cultural medical communication. Skills may be demonstrated in tasks listed in #2 above.
5. Demonstrates understanding and employs principles of communication

Employs principles such as confidentiality, patient autonomy, unconditional positive regard, and therapeutic aspects of the doctor-patient relationship in communication tasks listed in #2 above.

Levels of Achievement

It is assumed that incoming first-year medical students will have mastered written and verbal communication skills necessary for completing an undergraduate degree. These skills include:

- writing essays, formal reports or research papers
- making presentations
- basics of interpersonal communication and interpersonal skills
- small group communication
- public speaking

Competencies in the medical curriculum will build on these basic skills acquired in undergraduate education.

Level 1: The beginner /novice will meet criteria for effective communication in non-technical patient interactions (Beginner) following a standard protocol or with minimal medical or non-medical content. Examples include:

- telephone hotline counseling
- participation in health fairs
- research projects with patients as subjects
- exploratory standardized patient exercises

In those settings involving patients, students will demonstrate beginner-level listening skills, and patient relationship skills. These skills can include those directly relevant to or components of more advanced communication skills as described in levels 2 and 3 below. In beginner-level patient interactions, patients will not possess any characteristics that would pose difficult challenges to the student, for example a personality disorder or an altered state of consciousness.

Criteria for beginner level written communication include written work using the language of medicine, which serves as evidence of the ability to analyze or build insight into medical issues (e.g., interpersonal, social, policy/organizational, or scientific interpretation of phenomena in society, medicine, disease or illness). Oral presentations of these topics can satisfy criteria for verbal communication skills at the beginning level.
Level 2: The intermediate student will meet the criteria for effective communication by demonstrating competence (Intermediate) in basic clinical communication skills including:

- history taking
- patient write-ups (history & physical)
- progress notes
- professional level physician-patient relationship and listening skills
- counseling and patient education skills
- case presentation skills
- conducting a diagnostic interview
- conducting basic assessment interviews
  - mental status exam
  - alcohol and drug screening
  - functional status assessment, etc.
- physician-patient communication during physical exam and other procedures
- basic skills for interacting with families and family members.

The patient and/or family members may have certain characteristics that pose a moderate degree of difficulty for the student, such as moderate anxiety, a degree of resistance, or other communication barriers.

Level 3: The advanced student will meet the criteria for effective communication by demonstrating (Advanced) communication skills necessary for assuming responsibility for a patient’s care including:

- patient and family interactions
- interactions with peers and supervisors
- interactions with other members of the health care team

Advanced skills include specialized patient or family communication skills:

- use of translator
- telephone communication
- intermediate and advanced patient education and counseling including:
  - behavior change counseling to address risk
  - providing brief supportive counseling for depression and anxiety
  - delivering bad news, etc.
- intermediate or advanced interviews utilizing higher level interpersonal skills
  - managing difficult patients and/or difficult relationships, for example:
    - somatizing patient
    - personality disorders
    - hostile/angry patients
    - thought disorders
    - manipulative patients
  - negotiation and collaboration
- intermediate or advanced case presentation skills
- intermediate or advanced assessment interviews
  - psych screening/assessment
  - issues of sexuality/sexual function
  - domestic violence

Advanced level written communication skills include advanced history, progress notes, op notes, procedure notes, discharge instructions, dictation skills, discharge summaries etc. Note: Fourth year clinical experiences will be well suited for this skill level.

Table 2 — Variations in patient communication

Patient characteristics can be arrayed from least difficult to most difficult. A point system is applied with 0 = least difficult, 1 = more difficult, and 2 = most difficult.

0 — Least Difficult  1 — More Difficult  2 — Most Difficult
Nine Abilities
II. Basic Clinical Skills

The competent graduate obtains an appropriate history and performs a skillful, comprehensive examination in a variety of patient care encounters. The graduate correctly selects, proficiently performs, and accurately interprets clinical procedures and laboratory tests.

- Criteria for Assessment
  1. Examination of the patient. The graduate will be competent in the performance of comprehensive physical, functional, and mental status exams including:

     A. Comprehensive history—Adult
        • source and reliability
        • chief complaint
        • present illness
        • past history
        • current health status (allergies, immunizations, screening tests, environmental hazards, use of safety measures, exercise and leisure, sleep, diet, current medications, tobacco, alcohol, and other substances)
        • sexual history
        • family history
        • complete psychiatric history
        • psychosocial history
        • review of systems

     B. Comprehensive history—Child, as per adult history with modifications that take into account age-related differences, the patient’s chronological age and stage of development, and including relevant data on the following:
        • birth history (prenatal, natal, and neonatal)
        • feeding history (breastfeeding, infancy, childhood habits)
        • growth and development (physical growth, developmental milestones, social development)
        • childhood illnesses
C. General physical exam including:
   • general appearance
   • vital signs
   • skin
   • head, eyes, ears, nose, throat
   • neck
   • chest wall and back
   • heart
   • lungs
   • breasts
   • abdomen
   • external genitalia, male and female
   • pelvic including speculum exam
   • rectal and prostate
   • extremities
   • musculo skeletal
   • pulses and peripheral vascular exam
   • reflexes and complete neurologic exam

D. Complete mental status exam
E. General functional assessment
F. Pediatric physical exam
G. Neonatal exam
H. Pregnant patient
I. Emergency-directed examination
   • unconscious patient
   • cardiac/respiratory emergencies
   • multiple trauma

2. Performance of routine clinical procedures. The graduate will be competent to personally perform, and explain to patients the indications, complications, and limitations of routine clinical procedures including:

   A. Venipuncture, including blood cultures
   B. Starting an IV
   C. CPR, basic
   D. Arterial puncture (for blood gases)
   E. Control of gross external hemorrhage
   F. Insert nasogastric tube
   G. Work with sterile technique (e.g., gloving, sterile dressing change)
   H. Universal precautions (infectious)
   I. Pap Smear
   J. Suturing
   K. Injections: intradermal, sub-Q, IM, IV
   L. Placement of foley catheter; male, female
   M. Complete ACLS
   N. Normal vaginal delivery
   O. Incision and drainage of superficial lesions
   P. Basic dressings/wound care
   Q. Throat Swab

3. Familiarity with complex or specialized clinical procedures. The graduate will have observed and will be able to describe the indications, complications, and limitations of more complex or specialized clinical procedures including:

   A. Fluorescein staining and examination of the eye
   B. Lumbar puncture
   C. Ventilator management
   D. Thoracentesis
   E. Placement of central venous catheter
   F. Upper GI endoscopy
   G. Lower GI endoscopy
   H. Flexible bronchoscopy
I. Insertion arterial canula
J. Placement of Swan-Ganz catheter
K. Percutaneous liver biopsy or kidney biopsy
M. Bone marrow aspiration
O. Joint aspiration
P. Abdominal paracentesis
Q. Cardioversion
R. Tonometry
S. Fine needle aspiration e.g. breast, thyroid
T. Reduction of fractures
U. Casting of non-displaced closed fractures
V. Childbirth/delivery, other than normal vaginal delivery
W. Temporary transvenous pacemaker
X. Fetal monitoring
Y. Hemodialysis
Z. Colposcopy
A.1. Endometrial biopsy
A.2. Amniocentesis
A.3. Skin biopsy (punch and resection)
A.4. Exercise stress testing
A.5. Electro- and cryosurgical or laser removal of skin lesions

4. Performance of basic lab and diagnostic tests. The graduate will be competent to personally perform and will be aware of the indications for and limitations of basic laboratory and diagnostic tests including:

A. Gram stain
B. EKG
C. Stool occult blood
D. Urinalysis
E. Blood smears
F. Urine pregnancy test
G. Vaginal Smear wet prep

5. Familiarity with more complex or specialized lab and diagnostic tests. The graduate will be aware of the underlying theory, indications, complications, limitations, and patient experience of frequently used lab and diagnostic tests as well as be able to interpret the actual material data (such as images on a microscope slide or on X-ray film) and written reports of the tests including:

A. EKG
B. Urinalysis
C. Peripheral blood smear
D. Vaginal smear wet prep
E. Spirometry
F. Basic interpretations of imaging techniques to include (presently):
   • plane X-ray studies: CXR, KUB, skeletal XR.
   • CT
   • MRI
   • mammography
   • barium contrast GI studies
   • angiography
G. Interpret written reports only of:
   • Holter monitor study
   • EEG
   • EMG
   • PFTs
   • blood chemistry
   • hematology
   • tumor markers
   • cytology
   • acid-fast smears
   • culture and sensitivities
   • drug levels
• ABGs
• coagulation studies
• CSF studies
• stool for ova and parasites
• angiography
• cardiac ultrasound and Doppler studies
• pelvic, abdominal, cystic mass ultrasound
• noninvasive vascular studies
• anatomic pathology
• immunologic
• histology
• genetic testing
• serology
• radionuclide scans
• contrast renal and venous studies

o Levels of Achievement

Level 1: Beginner students should be able to perform the basic elements (1A–1G) of a history and physical examination using proper maneuvers, form, and structure, though not necessarily in a smooth, efficient, or proficient manner. Beginner students will be able to verbally describe the procedural steps necessary to carry out routine clinical procedures (2A–2M) and routine laboratory and diagnostic tests (4A–4E). Beginner students will have actually performed such procedures and tests and would be able to repeat them, with close supervision, though they may not be able to do them in a smooth, facile manner. This is the level of competence expected of students just prior to entering the clinical phase (clerkships) of their education.

Level 2: Intermediate students should be able to perform the basic elements (1A–1I) of a history and physical examination smoothly and efficiently. Intermediate students will be able to accurately differentiate normal from abnormal findings. Intermediate students will be able to describe verbally the steps taken in examining patients in emergency situations (1I) and be able to perform such an examination, though not necessarily in a well-organized, smooth, efficient, and proficient manner. Intermediate students should be able to perform routine clinical procedures (2A–2Q) and laboratory and diagnostic tests (4A–4G) smoothly and efficiently. Intermediate students will have actually performed such procedures and tests and will be able to repeat them, with close supervision, though they may not be able to do them in a smooth, facile manner. The graduate will have observed and will be able to describe the indications, complications, and limitations of more complex or specialized clinical procedures. Intermediate students will be aware of the indications, complications, and limitations of and be able to interpret common patterns from the written reports, and for some studies, from actual material data (e.g. such as images on a microscope slide or on X-ray film), more complex and specialized laboratory and diagnostic tests (5A–5G). This is the level of competence that all students are expected to attain by the time of graduation.

Level 3: Advanced students should be able to perform the basic and emergency elements (1A–1I) of a history and physical examination smoothly and efficiently. Advanced students should be able to perform routine and more advanced clinical procedures (2A–2Q) and laboratory and diagnostic tests (4A–4G) smoothly and efficiently. Advanced students will be able to verbally describe the procedural steps necessary to carry out advanced clinical procedures (3A–3A.5). Advanced students will have actually performed several such procedures and tests and would be able to repeat them, with close supervision, though they may not be able to do them in a smooth, facile manner. Advanced students will be aware of the indications, complications, and limitations of and be able to interpret from the written reports complex and specialized laboratory and diagnostic tests (5A-5G).

o More detailed information on defining levels of achievement for Basic Clinical Skills

The beginning level emphasizes proper form rather than finesse. Students at this level should possess the rudimentary skills in history and physical examination and routine clinical procedures necessary to function on a clinical service. Further repetition of these skills will enable the student to perform them with greater facility, efficiency, and accuracy. At this level the student may undertake the history and physical examination in a stereotypical fashion that may not be optimal in terms of efficiency or patient convenience. The student may not be able to always differentiate normal from abnormal. Beginner students will have practiced basic clinical procedures using models or fellow students and should be able to repeat those procedures, with supervision. Beginner students are unlikely to be able to perform these procedures in a smooth, facile fashion. They are likely to be unsuccessful in less than optimal settings (e.g., the patient with bad veins, uncooperative or nervous patients, catheter placement in patient with prostatic hypertrophy, etc.). In general, students should have attained a beginning level of competence by the end of their second year of medical school, just prior to entering their first clinical clerkships.

The intermediate level represents that level of competence in basic clinical skills expected of all graduates. Intermediate students should be able to perform all the functions described for beginner students in a smooth, efficient, facile, and accurate fashion. Graduates would be able to safely perform these procedures and obtain accurate and reliable information.
All students at the intermediate level will have also attained rudimentary skills in more advanced examinations and procedures. In general, students should be able to achieve this intermediate level of competence early in their fourth year of medical school when they have completed all the usual core clerkships and an advanced clerkship (subinternship).

Advanced skills are those that not all graduates would normally be expected to have actually performed. Students will usually attain advanced levels of competence in these skills by taking clinical electives in these areas. These are skills not expected to be acquired as part of the core clerkship experiences.

### III. Using Basic Science in the Practice of Medicine

The competent graduate recognizes and explains health problems based upon current scientific understanding. The graduate develops a plan for intervention that utilizes scientific understanding for optimum results.

#### o Criteria for Assessment

1. Recognizes a health problem: its immediacy and potential threats
   - identifies the relevant basic science principles related to an understanding of the pathophysiological process of the health problem
   - identifies clinical questions that arise in case-based learning related to a health problem
   - searches for information to answer clinical questions emerging from the case
   - evaluates the quality of the information gained from a literature search or consultation

2. Conceptualizes the pathophysiological process of this health problem
   - understands and explains its origin and progressive pathogenesis
   - understands its means of expression and consequences in molecular, cellular, and physiological terms

3. Conceives and presents a therapeutic plan
   - develops a strategy to effectively interrupt the origin, points of pathogenesis, and specific threats and consequences
   - defines therapeutic goals in physiological and molecular terms
   - recognizes all options available for treatment
   - understands the scientific rationale when selecting specific interventions, whether pharmacologic, physiologic, dietary, or behavior modification
   - knows and presents indications for a given drug, its mechanism of action, its half-life and dosage, and application in clinical situations
   - recognizes potential drug interactions and side effects
   - appreciates dietary implications for specific interventions

4. Ascertains effectiveness of an applied intervention
   - determines if pathophysiological process has been altered by therapy
   - employs concrete parameters and indicators of therapeutic success
   - recognizes that continued reevaluation of the therapeutic process is necessary

5. Communicates the pathophysiological rationale for the chosen therapy and expected outcomes at a level appropriate for faculty and staff, patients, and their families

#### o Levels of Achievement

Level 1: Beginner/novice students will meet the competency criteria through recognizing that basic science principles are clinically relevant to health problems and/or are foundational to the student of pathophysiological processes addressed in courses that certify for the intermediate level. Applying the basic principles of evidence-based medicine, the student will also raise clinical questions, conduct literature searches and critically appraise the literature.

Level 2: The intermediate student will meet the criteria for using basic science and evidence-based medicine in clinical practice by demonstrating a thorough understanding of the health problem in the context of case-based learning in second-year courses. Students will work through clinical cases that encompass the entirety of the health problem; its origin, points of pathogenesis, specific threats and consequences at the molecular, cellular, and physiologic levels. The student will integrate into these case analyses an understanding of the medical interventions available; the mechanisms of action of probable drug therapies, the indications or contraindications of the drug, and potential side effects. Students will also research the effectiveness of the chosen intervention towards achieving the therapeutic goals.

Level 3: Advanced students will meet the criteria for using basic science to guide therapy through the understanding and anticipation of the long-term natural and managed course of a chronic health problem, which in turn forms the basis for student’s development of management plans aimed at preventing or mitigating potential outcomes of the chronic situation. The advanced student will be able to explain a multi-system health problem in terms of pathogenesis, mechanisms of system-to-system interactions, and the plural potential complications and be able to present therapeutic goals and interventions aimed at the multiple pathophysiological forces in motion.
An advanced student will exhibit clinical decision analysis that weighs the pros and cons of proposed interventions, taking into consideration such factors as drug-drug interactions and the trade-offs of proposed drug interventions in the context of multi-system problems. Students will also be able to formulate or plan possible future interventions based on their understanding of the pathophysiology of the disease in question.

More detailed information on the Professional Development Program is included in Ability VI.

### IV. Diagnosis, Management, and Prevention

The competent graduate diagnoses, manages and prevents the common health problems of individuals, families, and communities in collaboration with them. The graduate develops a problem list and differential diagnoses, carries out additional investigations, chooses and implements interventions with consultation and referral as needed, determines outcome goals, recognizes and exploits opportunities for prevention, monitors progress, shares information and educates, and adjusts therapy and diagnosis according to results.

**Criteria for Assessment**

1. **Diagnoses the common health problems of individuals**
   - interprets the data from basic examinations (history, physical examination, laboratory) appropriately
   - based on such data, formulates an appropriate differential diagnosis and problem list
   - based on the differential diagnosis, problem list, and on discussions with the patient, selects, carries out, and interprets correctly appropriate additional investigations

2. **Manages the common health problems of individual patients**
   - chooses appropriate treatment based on data from patient examination
   - selects a specific treatment taking into account costs, benefits, and patient’s situation and preferences
   - obtains consultation and refers when needed (including non-physician consults and referrals)
   - determines appropriate goals of management
   - appropriately involves patient and patient’s family

3. **Integrates preventive interventions into the comprehensive health care of individuals**
   - identifies the screening, protective (e.g., immunization), and behavioral modifications needed for health promotion and disease prevention for each age group and sex, and for common ethnic and cultural groups
   - carries out the educational and other interventions needed to protect individuals against important health problems
   - integrates preventive interventions into overall diagnostic and therapeutic activities

4. **Monitors patient’s progress and modifies management accordingly**
   - identifies the parameters to be measured
   - follows plan of management throughout the course of illness, during convalescence, and during periods of good health
   - revises or modifies the initial diagnosis and treatment plan based on the patient’s progress and on new information

5. **Diagnoses and manages environmental causes of patient illnesses**
   - identifies the role of the patient’s family, occupation, and social environment in the current illness, as risk factors for future illness, and as factors that might affect therapeutic and preventive interventions
   - takes appropriate action to address those environmental causes of illness

6. **Diagnoses and manages the health problems and preventive needs of populations and communities**
   - identifies patterns of potential and existing health problems in the community
   - gathers additional data about the community from multiple sources including community residents themselves
   - diagnoses epidemics, endemics, and situations of high risk to health based on analysis of the data
   - collaborates with the community to identify appropriate approaches to manage such problems
   - implements, monitors, and evaluates the effectiveness of such interventions, involving the community as appropriate
Levels of Achievement

Level 1: The beginning student will meet the criteria for diagnosis, management, and prevention in situations that require more general knowledge rather than specific medical expertise, such as discussing prevention of sexually transmitted diseases with a group of adolescents. The problems and issues dealt with will represent the most prominent and common conditions. The beginning student will be able to identify general, rather than specific approaches to management, and generally will not be expected to actually carry them out in real settings. Level 1 represents the level of ability which should be achieved by a student prior to entering the clinical portion of the medical curriculum.

Level 2: The intermediate student will meet the criteria for diagnosis, management, and prevention in real clinical contexts in which specific medical expertise is needed. The intermediate student will be expected to interpret standard diagnostic studies and historical and physical examination data. From this data, the student will be able to correctly state the most likely diagnoses when presented with straightforward presentations of common problems in any of the major disciplines. Intermediate students will be expected to actually carry out management plans in those situations that are relatively straightforward and uncomplicated. Level 2 represents the minimum level of achievement at the completion of their medical education.

Level 3: The advanced student will be able to meet the criteria for diagnosis, management, and prevention in those situations that are less common, more complicated, and more problematic. They will be attuned to subtle cues and nuances. The advanced student will have an integrated approach to the care of individuals, families, and communities, taking advantage of opportunities for prevention and education in addition to the immediate physical cure. Level 3 represents an advanced level of achievement which would be achieved by some students in particular areas, usually those in which they had received additional specific training at an advanced level through an elective experience.

More detailed information on defining levels of achievement for Diagnosis, Management, and Prevention

Table 3—Levels of performance and activities for medical students

<table>
<thead>
<tr>
<th>Beginning level</th>
<th>Intermediate level</th>
<th>Advanced level</th>
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</thead>
<tbody>
<tr>
<td>Criteria for Assessment</td>
<td></td>
<td></td>
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<tr>
<td>1. Recognizes personal limits in knowledge and experience</td>
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<td></td>
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<tr>
<td>• initiates steps to rectify gaps in knowledge</td>
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<td></td>
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<tr>
<td>• researches, reviews, and extracts data from multiple sources</td>
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<td>• confers with knowledgeable colleagues, advisors, or experts</td>
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<tr>
<td>2. Applies acquired knowledge</td>
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<tr>
<td>• compiles, correctly presents, and properly references information</td>
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<tr>
<td>• demonstrates new skills to faculty and/or colleagues (e.g., through presentations, role play, or teaching)</td>
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<tr>
<td>• evaluates changes in academic or professional environment and develops some adaptive strategies to meet them</td>
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<tr>
<td>3. Maintains an interest in general education and science</td>
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<tr>
<td>• reads relevant literature</td>
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<tr>
<td>• exploits new opportunities for intellectual growth and professional enlightenment (e.g., additional courses, workshops)</td>
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</table>

Levels of Achievement

Level 1: The beginning student will meet the criteria for lifelong learning by exhibiting proficiency in lifelong learning skills—e.g. framing a question, utilizing modern information searching modalities, organizing data, compiling and using information—in the context of a structured setting, such as a medical school course.

Level 2: The intermediate student will demonstrate these same skills in the clinical or research setting. The student will undertake a special project that necessitates a literature search and demonstrates evidence of independent research and study.

Level 3: The advanced student will be expected to meet all of the criteria outlined above. In addition, the student’s project must result in one of the following: a) submission for publication; b) acceptance of abstract, poster, or oral presentation at an academic meeting.
VI. Professional Development and Personal Growth
The Brown Medical School seeks to enable a medical student to approach the practice of medicine with understanding of his/her personal strengths and weaknesses as well as the ability to develop a set of personal goals and aspirations. Toward those ends, a Program in Professional Development and Personal Growth will provide each student with opportunities to assess his/her personal values and priorities in order to balance the personal and professional commitments. Faculty advisors will be available to help the students address his/her own difficulties and to help him or her develop personally appropriate coping strategies. Faculty mentors will provide feedback and advice to the student on his or her professional behavior and how he or she responds to constructive criticism.

- Program Goals
  1. Recognizes personal strengths and limitations relevant to his/her practice of medicine
     - identifies preferred learning style
     - identifies activities that are easy or difficult to perform
     - identifies areas of academic (or professional) weakness
     - recognizes personal behavior in a group situation and consequences of that behavior
  2. Identifies and addresses problems—emotional, personal, and health-related—that might affect his/her health, well-being, or professional capabilities
     - delineates options to address the problem
     - pursues the assistance of others qualified to help (when necessary)
  3. Copes adaptively with stresses likely to occur during medical training and practice
     - describes own physical and behavioral responses to stress and realizes its onset/occurrence
     - identifies interpersonal situations that are most stressful and takes alternative approaches to handling them
     - recognizes the effect of personal stress-induced behavior on others
     - applies time management skills to the tasks of a student or physician
     - practices a personally effective method of relaxation
  4. Hears accurately and responds appropriately to constructive criticism from patients, peers, and supervisors
     - restates critical comments from others accurately
     - acknowledges the merit of critical remarks
     - modifies his/her behavior in response to constructive comments
  5. Recognizes and states personal values and beliefs relevant to his/her practice of medicine
     - determines priorities in professional or academic activities
     - describes values concerning a general approach to patients
     - states and explains personal views on special topics in medicine (e.g., right to die)
     - describes his/her view of a physician’s ideal relations with other health professionals and with the community
  6. Interacts collaboratively with faculty, other students and health-care team members
     - supports and fosters the identification of group goals and objectives
     - employs team building and maintenance skills in small groups and on the health-care team.
     - participates in shared decision making with patients and with the health-care team.

- More Detailed Information on the Professional Development Program
The Brown Medical School mission is to graduate scientifically well-educated physicians who strive to attain the highest standards of academic and personal honesty, compassion, integrity, dependability and self-awareness. We intend that our students follow in the altruistic tradition of medicine, placing the welfare of their patients and society above self-interest. Each student’s professional development plan will encompass both the art and science of medicine and reinforce the importance of character and ethical principles in the practice of medicine. The medical school will support academic and professional development with substantive focus on choice, through integrated curricular, mentoring, advising and co-curricular activities.
There are many paths students can take to demonstrate their work towards these goals. Brown Medical School, as well as the greater medical community, offers many options for students to participate in professional development activities. These opportunities can occur individually, with other medical students, as a class, as a medical school and along side and collaboratively with practicing physicians.

The Office of Professional Development offers interactive lecture/discussions, book forums, and opportunities to spend time with professionals engaged in the practice of medicine. Activities and programs offered through the Offices of Minority Medical Affairs, Medical Student Affairs, Women in Medicine, Curriculum Affairs, and Financial Aid are also professional development opportunities. Community service, collaborative learning groups and student mentoring groups are among university professional development activities.

Brown’s notion of liberal learning, with substantive focus on flexibility and choice, enables each student to participate in a variety of these opportunities, while addressing particular interests and needs. Collaboratively with advisors, students work to create and maintain a Professional Development Portfolio, in which they document participation and accomplishments and reflect on personal and professional growth.

VII. The Social and Community Contexts of Health Care
The competent graduate provides healing guidance by responding to the many factors that influence health, disease and disability, besides those of a biological nature. These factors include socio-cultural, familial, psychological, economic, environmental, legal, political and spiritual aspects of health care seekers and of health care delivery. Through sensitivity to the interrelationships of individuals and their communities, the graduate responds to the broader context of medical practice.

Criteria for Assessment
1. Appreciates the importance of the many non-biologic factors that influence health, disease, disability, and access to care
   • obtains information in the patient’s history of these factors
   • attributes proper importance to identified non-biologic factors
   • inquires about value systems and lifestyles in a non judgmental fashion
   • avoids stereotypical language (e.g., racist, sexist, or homophobic remarks)
   • identifies barriers to access of health care resources
2. Utilizes appropriate resources in the community that may provide support for reducing social causes of disease
   • becomes familiar with role of community resources and services provided
   • matches patients’ needs to appropriate community resources
   • communicates the availability of community resources to patients and their families
   • arranges referrals to community resources for patients and their families
   • cooperates with community resources through follow-up efforts and support
3. Acts as an advocate for better health for patients and the community
   • assists patients and their families in navigating through bureaucracy
   • supports community activities designed to improve health
   • supports social and political activities to improve access to health care
   • places patients’ and community’s welfare above narrow self-interest
   • encourages actions designed to enhance the total well-being of individuals, families and communities

Levels of Achievement
Level 1: Beginner/novice students will meet the criteria for the social and community contexts of health care by recognizing and pursuing self-reflection of their own cultural and spiritual traditions, as well as gender, class and sexual socialization experiences. Students will be able to articulate ways in which these factors could influence their approach to medical practice. They will be able to recognize and discuss these factors when presented with material designed to highlight these issues, such as trigger tapes. Beginning students can also meet the criteria through course work focused on the social and community contexts of health, illness, and health care delivery. Beginning students could familiarize themselves with the range of community services by visiting them, discussing the role of the agency with staff and clients, and observing the provision of services. Students could act as advocates by volunteering for community service even prior to having any medical training.

Level 2: Preclinical. Intermediate students will meet the criteria for the social and community contexts of health care by evaluating health needs through active engagement with the community with the goal of organizing and/or implementing programs to meet those needs. Samples of ways in which students might meet intermediate criteria follow: In planning a project, intermediate preclinical students interview key informants in the community, obtain epidemiological data, research the literature relating to the problems under consideration, and keep all parties informed as plans progress, modifying them accordingly based on feedback. Advocacy can also
take several forms. Preclinical students advocate for individuals and families by helping them obtain the services to meet their health care needs. Students advocate for the community through social and political action. Throughout the experience, intermediate preclinical students recognize and respond to the values and perspectives of the community.

Clinical. Intermediate student will meet the criteria for the social and community contexts of health care in patient-care encounters with individual patients and their families. Students will elicit and identify non-biologic factors as part of their routine history taking and include those issues, as appropriate, in their problem list formulations and management plans. Students will take personal responsibility for discussing these issues with patients, assessing their needs and matching them to appropriate community services, arranging for the referral and assisting the patient and family in navigating through any bureaucratic hurdles. Students will take the initiative in following up to see if the arrangements were carried through and offering support and encouragement to the patient and cooperation with the community agency. Students will work with their individual patients and families to enhance their total wellbeing. Throughout the experience, intermediate clinical students recognize and respond to the values and perspectives of the community.

Level 3: Advanced students will meet the criteria for the social and community contexts of health care through pro-active individual initiative and leadership. These students will actively seek out additional information of a non-biologic nature from other professionals, school and agency staff, and members of the extended family. They will be able to generalize from individual and family problems to a broader community context. They will be able to analyze these community health problems in the context of political, sociological, cultural, economic and other factors. Advanced students will go from analysis to action, taking the initiative themselves, if necessary, to promote solutions to the identified problems.

More information on defining levels of achievement for Social and Community Contexts of Health Care

This ability deals very directly with attitudes and values. Values and attitudes are difficult to assess directly; instead, an indirect inventory must be taken by listening and observing behaviors that reflect those values. The criteria listed above reflect the values and attitudes desired in the graduate while the clusters of examples listed under each criteria reflect the behavioral indicators.

The levels of achievement are based on a hierarchy of how individuals respond to values and attitudes. At the lowest level, students are expected only to recognize and acknowledge issues reflective of the value. At the next level, students are expected to show some sense of appreciation of the importance of the issues, thus ascribing some value to them. At the highest level, students respond to these issues spontaneously, reflecting an incorporation of the value or attitude into their own internal value system.

Thus, the levels above reflect this hierarchy of expectation. At the novice level, students are handed the issues on a “silver platter” and are expected to acknowledge and recognize the issues. The emphasis at this level is on self-awareness, developing awareness of issues outside oneself, and opening oneself to greater sensitivity to these issues. Students are expected to show a tolerance of diverse value systems and lifestyles.

At the intermediate level, students are expected to respond to these issues at the level of the individual patient and family. The response is expected to be directly related to the stimulus for action. It is not expected, at this level, to kindle a wider ranging response that goes beyond the stimulus elicited by the individual patient’s situation. Students at this level are likely to be supportive of broader community-wide efforts to enhance health and may play an active role in those efforts, but as followers, not leaders.

At the preclinical intermediate level, students may gain only one competency credit at this level, and he/she must be supervised and evaluated by a faculty or staff member of the medical school or other appropriate institution.

The advanced level reflects a much greater degree of commitment and internalization by the students. Rather than being reactive to a specific situation, the advanced students are pro-active. A given stimulus will act to kindle a much wider set of responses not limited to the individual patient or circumstance. These are students likely to be deeply committed to community service and show promise as potential leaders in this area. These students will not only value community-wide efforts in these areas, but will be passionately committed as well.
VIII. Moral Reasoning and Clinical Ethics

The competent graduate recognizes the ethical dimensions of medical practice and health policy; identifies alternatives in difficult ethical choices; analyzes systematically the conflicting considerations supporting different alternatives; and formulates, defends, and effectively carries out a course of action that takes account of this ethical complexity. The graduate combines a willingness to recognize the nature of the value systems of patients and others with commitment to his/her own system and the ethical choices necessary to maintain his/her own ethical integrity.

Criteria for Assessment

1. Understands basic ethical concepts and applies them in moral reasoning in the medical and health care context

2. Recognizes the ethical dimensions of medicine
   - ethical dimensions in the treatment of individual patients
   - ethical dimensions of issues in health policy
   - ethical dimensions in relations with other health care professionals

3. Identifies the conflicting ethical considerations in a particular ethical choice
   - different values affected by alternative courses of action
   - relevant ethical obligations or duties
   - relevant moral rights
   - relevant considerations of justice

4. Systematically analyzes and defends ethical choices in the treatment of an individual patient
   - identifies alternative courses of action
   - determines and obtains medical information or facts relevant to the patient’s treatment and care
   - determines the ethical values, obligations or duties, and rights implicated in the patient’s treatment
   - determines and articulates the factors that affect the relative weight to be accorded to different ethical considerations
   - selects and defends a particular course of action

5. Determines, articulates, and analyzes the ethical issues in health policy
   - how institutional frameworks and practices affect patient care
   - the different ethical considerations bearing on particular health policy issues and choices
   - the responsibilities of health care professionals in health policy

6. Determines, articulates, and analyzes the ethical issues in relations with other health care professionals
   - what physicians’ social and professional responsibilities are for insuring the integrity of the profession and the quality of care provided by other professionals
   - how ethical norms, rules, and guidelines developed by professional groups and societies bear on ethical choices

7. Identifies relevant case and statutory law bearing on ethical issues and choices; analyzes and defends positions about its role in ethical choices
   - the major variations in state law governing health care
   - the responsibilities and duties the law imposes on health care professionals (e.g., the nature and limits of the duty to maintain confidentiality)
   - the alternatives in patient care and health practice permitted or proscribed by law
   - the rationale for not conforming to the law when one’s ethical responsibilities require it

8. Demonstrates and employs skills necessary to implement ethical choices in medical practice
   - communicates clearly
   - knows when other persons, expertise, or resources are needed resolution of ethical choices
   - knows how to obtain this additional help

9. Effectively integrates the above ethical skills in the care of his or her own patients, including*
   - ability to obtain a valid consent or refusal of treatment
   - ability to evaluate a patient’s competence to consent to or refuse treatment, and how to proceed if the patient is incompetent
   - ability to decide when it is morally justified to withhold information from a patient
   - ability to care for patients with a poor prognosis, including patients who are terminally ill, in an ethically sensitive manner
   - ability to integrate considerations of equity into care of one’s patients

*Levels of Achievement
Level 1: Moral Theory. The beginning/novice student will be able to employ ethical concepts and reasoning when presented with typical ethical cases in medicine, as well as be able to recognize ethical issues in medical practice and identify most relevant ethical considerations in them.

Level 2: Clinical Application The intermediate student will be able to identify patient care and health policy ethical issues and choices in his or her own clinical experience; to evaluate critically alternative ethical courses of action by analyzing and articulating reasons for the relative weight or importance of the different ethical considerations bearing on each choice; to select and ethically defend a course of action.

Level 3: Advanced Project. Advanced level credit may be obtained for an advanced project done on an individual or group basis under the supervision of an appropriate mentor. Examples include, but are not limited to, an under-graduate honors thesis in bioethics, an internship at an ethics institute, and an independent study planned with a mentor that focuses on an ethical issue in a clinical setting. For a project that is done in a clinical setting, pre-approval by the Ability VIII Assessment Committee is required.

IX. Problem Solving

The competent graduate recognizes a problem and is able to take appropriate steps to address the problem. The graduate integrates this ability with all other abilities and employs them in rational decision-making processes.

Criteria for Assessment
1. Recognizes that a problem exists
   • is observant
   • is empathetic
   • separates relevant and irrelevant input
2. Examines the problem from different points of view
   • is tolerant of other concerns and opinions
   • considers the socioeconomic and cultural contexts of the problem
   • is willing to talk to others with different points of view
   • considers a problem as an opportunity for change or advancement of knowledge
3. States the problem clearly and objectively
   • organizes elements appropriately
   • focuses on issues having the greatest impact
   • defines severity and extent of problem
4. Forms flexible potential solutions
   • applies prior knowledge to a new experience
   • recognizes limitations of prior experience or knowledge
   • identifies new information required to solve the problem
5. Collects and integrates necessary information
   • identifies sources of information
   • efficiently uses sources to obtain information
   • proposes and carries out research to generate new information
   • integrates and interprets factual information
   • evaluates information with respect to potential recommendations
6. Formulates an informed plan of action to solve a problem
   • recognizes internal and external factors influencing plan
   • identifies potential barriers
   • anticipates opposition and develops alternative strategies
   • considers potential adverse and beneficial secondary effects of plan
7. Implements a solution
   • communicates
   • takes action
   • utilizes a “team approach” when appropriate
   • plans/carrries out long term follow up and reevaluation
Levels of Achievement

Level 1: The beginner/novice student will meet the criteria for problem solving by displaying competence in basic problem-solving skills as applied to a non-medical or peripherally medical problem. The student is familiar with the knowledge base required to solve the specific problem, which may be uni-dimensional or rather straightforward in scope.

Level 2: The intermediate student will meet the criteria for problem solving by demonstrating competence in some of the other Brown abilities, as well as displaying more advanced problem solving skills. The student will be familiar with the knowledge base required to solve the specific problem of more involved depth and breadth.

Level 3: The advanced student will meet the criteria for problem solving by demonstrating competence in all the Brown abilities, in addition to displaying highly developed problem solving skills. The advanced student will confront multi-dimensional problems of a biomedical nature that require a detailed knowledge base.

More detailed information on defining levels of achievement for Problem Solving

Problem solving is viewed as an overarching ability within Brown’s competency-based curriculum. While many of the other abilities have a problem-solving component within them, the discrete ability Problem Solving transcends all other abilities. In this context, problem solving involves elements of ingenuity, resourcefulness, flexibility of thought and action, determination, decisiveness, and commitment.

This ability’s definition presupposes that students already possess the requisite knowledge and skills to accomplish a task. The problem-solving ability represents that additional dimension that allows students to get the job done despite unforeseen obstacles, unanticipated circumstances, unusual situations, and unexpected actions or consequences.

The levels represented here reflect a progression of problem solving by the physician-in-training. The beginning level is what is expected of a broadly and liberally educated student at or near the culmination of the college undergraduate years. A thesis or senior project could be used as a measure of problem solving, even if the problem were outside the traditional medical sphere.

The intermediate level problem solver would be able to integrate the fundamentals of biology and medicine with strategies for problem solving. The patient-centered, problem-based learning formats of pathophysiology provide a good vehicle for assessment.

The advanced level of problem solving takes place within a real clinical context. Students should be able to integrate the basic sciences and clinical aspects of medicine spanning the spectrum from the molecular to the community level and from conception to old age. Clerkships and clinical electives offer good opportunities for assessment as would well-designed OSCEs (objective structured clinical examinations).
I. BASIC BIOLOGY OF CELLS

A. Molecular/Cellular-Organization & Structure

1. Cellular (Histology)
   a. cell membranes
   b. organelles
   c. cytoskeleton
   d. nucleus-chromatin, chromosomes, genes
   e. cell junctions
   f. cell specialization (by organ and cell type)
   g. cell differentiation, oogenesis, and organogenesis (embryology);
      fertilization & implantation

2. Molecular (Structural Biochemistry)
   a. amino acids & proteins (lipoproteins & glycoproteins)
   b. carbohydrates & polysaccharides
   c. lipids & glycolipids
   d. nucleic acids
   e. others (vitamins, minerals)

B. Molecular/Cellular-Maintenance and Homeostasis

1. Basic features of enzymes (protein chemistry)

2. Biosynthetic and degradative pathways (biochemistry)
   a. nucleic
   b. carbohydrates

3. Energy metabolism (biochemistry)
   a. glycolysis
   b. oxidative phosphorylation
   c. gluconeogenesis
   d. fatty acid oxidation
   e. urea cycle

4. Genetic regulation (molecular biology)
   a. transcriptional
   b. translational
   c. post-translational modifications

5. Molecular endocrinology (cellular communication and function of cell
   membranes; cell biology, electrophysiology)
   a. sorting and trafficking of membrane and secreted proteins
   b. ion channels, electrophysiology
   c. signal transduction through second messengers
   d. transport processes
   e. autocrine, paracrine, endocrine systems

6. Cell replication (cellular biology)
   a. DNA replication (DNA synthesis and repair enzymology)
   b. mitosis
   c. mechanisms of genetic inheritance; Mendelian genetics
   d. retrovirus
C. Molecular/Cellular Defense against injury and disease (immunology: structure, function,

1. Barrier defenses
2. Cellular immune defenses  
   a. innate—non-specific  
   b. acquired—specific  
3. Humoral immune defenses  
   a. antibodies  
   b. interferons, cytokines, prostaglandins, etc.
4. Active and passive immunity
5. Inflammatory response
6. Wound healing
7. DNA repair

D. Molecular/Cellular-Mechanism of disease/injury and physiological response  
   (microbiology, pathology, toxicology)

1. Mechanisms  
   a. microbial disease  
      i. bacteria  
      ii. viruses  
      iii. fungi  
      iv. parasitic organisms  
   b. environmental disease  
   c. neoplasia  
   d. malnutrition  
   e. senescence (gerontology); somatic mutations & repair mechanisms  
   f. metabolic disorders  
   g. auto-immune disorders  
   h. ischemia & hypoxia  
   i. genetic disease (chromosomal & single gene disorders)
2. Physiological response  
   a. antibodies  
   b. interferons, cytokines, prostaglandins, etc.

E. Molecular/Cellular-Diagnosis and interventions/therapies

1. Diagnosis (laboratory medicine)  
   a. biochemical (enzymology, photometry, RIA)  
   b. biopsy (hematology, cellular pathology)  
   c. genetic diagnosis—Western, Southern, Northern, PCR, RFLPs, cytogenetics  
   d. microbiology  
   e. urinalysis
2. Interventions/therapy  
   a. drug therapy (pharmacology, toxicology, drug development)  
   b. drug therapy -molecular targets of drug action (receptors/enzymes)  
   c. drug therapy -chemical aspects of drugs (structure/activity relationship and importance in drug distribution)  
   d. drug therapy - drug metabolism (enzymology), pro-drugs  
   e. drug therapy - pharmacological vs. physiological antagonism  
   f. drug therapy -rational drug design strategies  
   g. drug therapy -pharmacologies  
   b. gene replacement therapy (molecular biology)  
   c. immunotherapy—vaccines, monoclonal Ab, cytokines, adjuvants  
   d. nutritional  
   e. radiotherapy
To be applied as appropriate to the following organ systems:

1. Cardiovascular  
2. Endocrine  
3. Gastrointestinal  
4. Hematologic & Immunologic  
5. Human Reproductive, Growth & Development  
6. Nervous System-Central/Peripheral & Special sensory organs  
7. Renal, Urinary & Body fluids  
8. Respiratory  
9. Skin (integument)  
10. Skeletal

F. **Single Organ/Organ System-Organization & Structure**
   1. Gross anatomy  
      a. components  
      b. anatomical connections within the organ/organ system  
   2. Morphology of cellular constituents  
   3. Unique subcellular features of each organ/organ system

G. **Single Organ/Organ System- Maintenance/homoeostasis/normal function**
   1. Physiological features of each organ/organ system  
      a. primary functions  
      b. secondary and supportive functions  
      c. normal interactions with other organ/organ systems  
   2. Metabolic mechanisms within each organ/organ system  
   3. Response to endogenous substances (transmitters, hormones, etc.)  
      a. agents with a facilitatory effect on function  
      b. agents with an inhibitory effect on function  
      c. feedback mechanisms

H. **Single Organ/Organ System-Defense against injury by individual organs/organ systems**
   1. Protective features preventing injury  
      a. anatomical and structural  
      b. physiological and biochemical  
   2. Adaptive responses to stress to temporarily maintain function  
   3. Age-dependent defenses/vulnerabilities to injury

I. **Single Organ/Organ System-Mechanisms of responses to disease and injury (pathophysiology of disease)**
   1. Signs and symptoms of diseases of each organ/organ system  
      [Clinical examples should commonly occur in medical practice, contribute to our understanding of underlying principles of pathophysiology for a specific organ/organ system, illustrate therapeutic principles, and highlight specific responses of individual components of an organ or organ systems when clinically relevant.]
   2. Pathophysiological mechanism of disorder  
      a. compression/mechanical/physical  
      b. ischemic/hypoxic  
      c. loss/dysfunction of an essential component  
      d. infectious diseases  
      e. immunological disorders  
      f. neoplasms—1° and metastatic  
      g. congenital abnormalities  
      h. genetic disorders  
      i. biochemical disorders  
      j. toxic/metabolic conditions  
      k. degenerative diseases  
      l. iatrogenic  
   3. Reparative mechanisms  
      a. restoration of cell morphology  
      b. restoration of cell/organ physiology
J. **Single Organ/Organ System-Therapeutic interventions**

1. Pharmacological interventions
   a. pharmacokinetics
   b. actions of representative/commonly used agents-function specific- disease specific
2. Potential side effects of pharmacological interventions
3. Manifestations of drug toxicity
4. Nonpharmacological interventions
   a. surgical
   b. nutritional

II. **HEALTH OF FAMILIES:**

A. **Whole Person/Family-Organization and structure**

1. General principles and concepts
   a. biopsychosocial model, including psychological and behavioral components of illness
   b. continuums of behavior and behavioral conditions
   c. continuums of behavior and behavioral conditions adaptive ⇑ maladaptive
   d. continuums of behavior and behavioral conditions normal ⇑ pathologic
   e. continuums of behavior and behavioral conditions symptomatic ⇑ symptoms ⇑ disorder/disease ⇑ illness
   f. continuums of behavior and behavioral conditions problem ⇑ disorders/diagnostic categories
   g. process of behavior change
   h. psychological development
   i. doctor-patient relationship
   j. physician’s role in addressing behavioral issues functions of the medical encounter
   k. functions of the medical encounter- data gathering/problem, developing a therapeutic relationship, patient education and counseling, problems

2. Embryonic development
   a. effects of individual behaviors
   b. other threats (environmental, etc.)
   c. family structure/interaction that promote or impair healthy development

3. Topographical (surface) gross anatomy, e.g., developmental stages, cosmetic concerns
4. Lifespan developmental stages (birth, puberty, midlife, and aging), individual, physical, psychosocial family—evolution of familial relationships over the lifespan
5. Family structure, including ethnic variations in interrelationships/interactions, e.g., single parenthood, extended family, isolation, dysfunctional family patterns
6. Sociocultural influences

B. **Whole Person/Family Maintenance and homeostasis**

1. Normal psychological development over life cycle
   a. issues related to physical growth and maturation, intellectual growth, and social and sexual development
   b. issues dealing with family, peers, and significant others

2. Sociocultural and gender issues
   a. attitudes toward health and disease
   b. gender identity and gender roles as motivational factors in individual function and response
   c. family roles, protection, cause of stress, intergenerational conflict
   d. cultural variation in wellness behaviors

C. **Whole Person/Family Defense against disease and injury**

1. Personal preventive behaviors that afford possibilities for health promotion and disease prevention
2. Individual psychological defense mechanisms
   a. behavioral coping strategies, e.g., relaxation, meditation, exercise
   b. psychodynamic coping strategies, e.g., denial, repression, sublimation, and projection
3. Primary preventive role of family in terms of role modeling, behaviors, and education
D. Whole Person/Family Mechanism of and response to disease & injury

1. Behavior of individuals
   a. psychological factors affecting adaptations to sickness and injury, psychological symptoms, personality trait or coping style
   b. psychophysiologic state
   c. interpersonal disturbance
   d. normal and pathological responses to sickness and injury
   e. nonadherence/noncompliance
   f. pain/illness behavior
   g. overutilization of health care
   h. overprotectiveness (parental, family)
   i. shame and humiliation, stigma, loss of autonomy & control
   j. behavioral problems, e.g. affective & personality disorders, schizophrenia

2. Function and behavior of families
   a. adaptive models
   b. family violence—child abuse, sexual abuse, spouse abuse, elder abuse, co-dependence/enabling

E. Whole Person/Family-Interventions and therapies

1. Theories and principles of individual-oriented interventions
   a. patient education
   b. behavioral therapy
   c. other forms of psychotherapy

2. Theories and principles of family-oriented interventions
   a. family education
   b. marital therapy
   c. various forms of family therapy

3. Pharmacological interventions
   a. mechanisms of action of psychoactive pharmaceuticals e.g., anxiolytics, neuroleptics, antidepressants
   b. adverse effects, e.g., addiction

4. Legal/ethical issues of individuals
   a. specific issues, e.g., informed consent, right to refuse treatment
   b. physician’s role in advising and decision making, e.g., when physician’s ethical principles conflict with those of the patient

5. Legal/ethical issues of families
   a. specific issues, e.g., rights of minors, issues related to divorce/child support, health care decisions for incompetent family members, confidentiality
   b. health professional’s role in protection of family members, e.g., child abuse

F. Preventive/Developmental Encounters Infancy (Birth to one year)

1. Function and development
   a. normal vs. abnormal physical growth & development
   b. normal vs. abnormal cognitive and psychosocial development
   c. factors affecting development—congenital abnormalities, low birth weight, maternal substance abuse, heredity
   d. anticipatory guidance to parents regarding growth, development, necessary activity level
   e. screening methods to detect developmental abnormalities

2. Nutritional needs in the first year of life, e.g., superiority of breastfeeding, introduction of solids, whole milk

3. Mental health—risk factors in the home affecting mental health growth, including quality of parent/parent and child/parent relationships, family stress, parental substance abuse, single parent family, family history of mental illness

4. Substance abuse, including screening methods for substance abuse in the newborn and parent

5. Sexual behavior
G. Preventive/Developmental Encounters Childhood

1. Function and development
   a. normal vs. abnormal physical, neuromuscular, cognitive, and psychosocial development
   b. risk factors for developmental abnormalities including medical, environmental, socioeconomic, and behavioral factors
   c. role of the well child visit in assessing developmental milestones
   d. information needed to counsel patients for reduction of risk factors

2. Nutrition
   a. risk factors for poor nutrition, e.g., education, socioeconomic factors, medical conditions, heredity
   b. growth parameters and growth charts
   c. nutrition history and nutritional counseling as intervention when a nutritional problem is identified

3. Mental health
   a. common mental health problems in this age group
   b. risk factors, e.g., parental support systems, coping skills, mental health history, substance abuse

4. Substance abuse
   a. prevalence and negative impact on children
   b. risk factors
   c. role of the Child Protective Agency

5. Sexual behavior
   a. risk factors and prevalence for child sexual abuse
   b. information needed to counsel parents, on decreasing risk factors (for abuse) in the child’s environment and on sexual development of children
   c. history and physical examination findings indicative of sexual abuse

6. Injury
   a. information needed to counsel parents regarding risk factors for accidental injury, e.g., poor supervision, inappropriate sports/toys
   b. appropriate responses to suspicion or proof of nonaccidental trauma

7. Occupational issues and environmental health
   a. factors indicating readiness for school and risk factors for school failure, e.g., medical conditions, poor nutrition
   b. risk factors for exposure to environmental toxins

8. Other
   a. immunization schedules
   b. prophylaxis of exposure to infectious diseases, e.g., meningitis, hepatitis, and tuberculosis

H. Preventive/Developmental Encounters Adolescence
1. Function and development—anticipatory guidance and counseling for:
   a. development of sense of self-identity and self-worth, responsibilities and obligations
      associated with increasing level of freedom and separation from parents
   b. puberty, sexuality, dating, and interpersonal relationships
   c. pressures associated with academic achievement and career development
   d. peer pressures involving drug/alcohol use and sexual experimentation

2. Nutrition
   a. nutritional requirements, including those related to strenuous exercise
   b. risks inherent in fad diets, eating disorders, and intentional weight gain or loss

3. Mental health
   a. screening methods for stress, depression, and suicidal intent
   b. suicide prevention

4. Substance abuse
   a. elements of a history (from adolescent or family) necessary to assess tobacco, alcohol, and illicit drug use, e.g., use of a modified CAGE questionnaire
   b. information necessary to counsel for smoking cessation and limiting alcohol consumption
   c. treatment programs available for dealing with alcohol and substance abuse

5. Sexual behavior
   a. sexually transmitted diseases—elements of a history necessary for recognition
   b. sexually transmitted diseases—indications and methods for screening
   c. counseling methods for safer sexual practice
   d. counseling information on contraceptive options
   c. recognition of a sexually abused individual

6. Accidental injury—preventive strategies related to the major causes of injury and death, e.g., firearms, gang violence, motor vehicle accidents

7. Occupational and environmental health, including excessive sun exposure

8. Specific diseases—appropriate immunizations for this age group

I. Preventive/Developmental Encounters Adults

1. Function and development—anticipatory guidance and counseling for:
   a. commitment to intimate personal relationships
   b. parenting
   c. integration of exercise into lifestyle

2. Nutrition—counseling for:
   a. minimum requirements for good nutrition: recommended intakes of fat, cholesterol, complex carbohydrates, fiber, calcium, and sodium
   b. dietary change to control weight

3. Mental health
   a. screening methods for stress, depression, and suicidal intent
   b. suicide prevention

4. Substance abuse
   a. elements of a history necessary to assess tobacco, alcohol, and other substance use (licit and illicit), including use of CAGE questionnaire
   b. information to counsel for smoking cessation and limiting alcohol consumption
   c. treatment programs for alcohol and other substance abuse

5. Sexual behavior
   a. sexually transmitted diseases
   b. sexually transmitted diseases—elements of a history of sexual activity needed for recognition
   c. sexually transmitted diseases—indications and methods for screening
   b. counseling for safer sexual practices
   c. risk/benefit of contraceptive options

6. Accidental injury—preventive strategies related to the major causes of accidental injury, e.g., fire, firearms, motor vehicle accident, and back injury

7. Occupational and environmental health
8. Specific diseases—opportunities for primary, secondary, and tertiary preventive interventions for the following diseases:
   a. atherosclerotic cardiovascular disease
   b. osteoporosis
   c. diabetes mellitus
   d. breast cancer
   e. colorectal cancer
   f. cervical cancer
   g. testicular cancer
   h. skin malignancy
   i. dental and periodontal disease

9. Immunizations appropriate for this age group

J. Preventive/Developmental Encounters Elders (age 65 or older)

1. Function and development
   a. concepts of functional impairment, i.e., disability
   b. functional status screening tools, e.g., ADL & IADL
   c. interventions, e.g., therapy to reduce disability and caregiver burden

2. Nutritional
   a. nutritional risks
   b. elements of a dietary history

3. Mental health
   a. risk factors of special concern—depression, suicide, abnormal bereavement, and family stress
   b. depression screening tools; appropriate preventive interventions for mental illness

4. Substance abuse
   a. substances commonly abused by elders and their risk factors (alcohol, tobacco, OTC and prescription meds)
   b. “brown bag” medication assessment techniques
   c. screening for substance abuse, e.g., CAGE questionnaire
   d. information to counsel for smoking cessation and limiting alcohol consumption

5. Sexual health
   a. primary causes of impotence; barriers to achieving sexual gratification in elders
   b. elements of a sexual history

6. Accidental injuries
   a. prevention of accidental injury (burns, falls) in the elderly and risk factors for falls
   b. use of home safety, gait, and balance assessment in prevention of falls

7. Advance directives, e.g., living will, durable power of attorney for medical affairs and the need to obtain patient opinion on terminal life issues

8. Specific diseases—opportunities for primary, secondary, and tertiary preventive interventions for the following:
   a. skin malignancy
   b. special senses (visual and auditory impairment)
   c. gum and dental disease
   d. neurologic (dementia and stroke)
   e. cardiovascular (CAD, hypertension)
   f. colorectal cancer
   g. cervical cancer
   h. prostate cancer
   i. diabetes mellitus
   j. thyroid disease
   k. renal disease
   l. postmenopausal osteoporosis

9. Immunizations appropriate for this age group
K. Preventive/Developmental Encounters Pregnancy

1. Function and development
   a. screening methods for high risk obstetrical status
   b. prenatal visits- monitoring of developmental parameters and timing of pertinent laboratory tests
   c. medical and counseling interventions for specific problems
   d. prematurity, including importance in neonatal morbidity and mortality
   e. rates of neonatal mortality in the United States

2. Nutrition, including nutritional and vitamin components of prenatal diet

3. Mental health
   a. emotional and psychological stressors unique to pregnancy
   b. elements of a history necessary for assessment
   c. postpartum depression and other threats to mental health

4. Substance abuse
   a. prenatal and subsequent developmental effects of abused substances
   b. screening methods to detect
   c. prescription drugs, including risks attached to use during pregnancy

5. Sexual behavior
   a. techniques for screening and treating sexually transmitted diseases
   b. pregnancy-related factors for which intercourse should be avoided

6. Accidental injuries—accident prevention techniques, e.g., variation in seat belt use

7. Occupational and environmental injury, including elements of a history necessary to assess pregnancy-specific risks, e.g., lead, radiation, cadmium, solvents, pesticides

8. Specific diseases—opportunities for primary, secondary, and tertiary preventive interventions for the following:
   a. toxoplasmosis
   b. rubella
   c. hepatitis
   d. HIV disease
   e. chicken pox
   f. diabetes mellitus
   g. pregnancy-induced hypertension/preeclampsia
   h. Rh disease

III. COMMUNITY

A. Structure of the U.S. health care system

1. Major features and forces that led to its current structure

2. Financial and organizational structures—profit and nonprofit—of competing institutions and their roles
   a. the fee-for-service system supported through employment with some governmental support, i.e., Medicare & Medicaid
   b. hospitals, HMOs, physician groups, solo practitioners, managed care schemes
   c. profit and nonprofit insurance companies/reimbursement of hospitals and practitioners

3. Current stresses on the U.S. health care financing system and the potential for change

B. Public health methodologies and policies

1. Public health, epidemiology, and biostatistics—major concepts and methods, e.g., sensitivity, specificity, case-control studies, incidence rates, case fatality rates, infant mortality rates

2. Public policy and health policy—how these are formulated and what major issues are currently under consideration
C. Issues in the health care system

1. Availability and accessibility of medical care, including measures of utilization, e.g., length of stay, admission rates

2. Costs
   a. factors causing costs to rise, e.g., new technologies, specialization, open-ended financing, patient expectation
   b. efforts to constrain costs, e.g., prospective payment, increased deductibles and co-payments, rationing

3. Quality and acceptability
   a. objective measures and subjective perceptions of quality and patient satisfaction in the system as applied to all consumers
   b. impact of economics on the quality of care; the problem of uninsured and underinsured persons in the U.S. and efforts to address the problem

4. Special population group issues—health care problems of underserved populations, e.g., racial, disabled, and chronically ill

5. Practice issues
   a. legal and ethical arguments pertaining to current topics health care policy, e.g., malpractice, advertising and marketing, conflicts of interest
   b. issues pertaining to current topics in public health, e.g., compulsory HIV testing, hiring discrimination based on health reasons, mandating healthy behaviors, role of health professions in responding to violence in the family and community

D. Prevention

1. Chemical, immunological, and environmental approaches, e.g., immunization, fluoridation, iodination of salt

2. Behavioral, e.g., interventions designed to enhance community health, role of physicians in advocacy, educational efforts to effect behavioral change, impact of religion and morality on health beliefs

3. Political and regulatory interventions designed to enhance community health, e.g., labeling requirements, handgun control, food and drug, occupational safety and health, clean air and water

IV. MEDICAL ENCOUNTERS

A. Acute Encounters-Pregnancy

1. Cardiovascular
   a. hypertension
   b. hypertensive disorders, including pregnancy-induced (preeclampsia)

2. Endocrine/metabolic
   a. gestational diabetes mellitus
   b. hyper- and hypothyroidism
   c. hyper- and hypoparathyroidism

3. Gastrointestinal

4. Hematologic/immunologic, including anemia

5. Infectious diseases
   a. viral infections
   b. bacterial infections
   c. Rickettsial infections
   d. fungal infections

6. Labor and delivery
   a. preterm labor/delivery
   b. premature rupture of membranes
   c. abnormalities of position, e.g., breech birth
   d. fetomaternal hemorrhage
   e. birth trauma
   f. neonatal resuscitation

B. Acute Encounters-Fetus/Neonate

1. Cardiovascular diseases
a. congenital heart disease-cyanotic congenital heart disease and noncyanotic congenital heart disease
b. congestive heart failure
c. dysrhythmias
d. hypertension
e. myocarditis/cardiomyopathy
f. patent ductus arteriosus
g. shock

2. Endocrine/metabolism
   a. adrenal disorders
   b. inborn errors of metabolism
   c. specific metabolic derangements- hypoglycemia, metabolic acidosis
d. infants of diabetic mother

3. Gastrointestinal disorders
   a. necrotizing enterocolitis
   b. hyperbilirubinemia
c. nutrition
d. gastrointestinal bleeding

4. Genetics, including congenital malformations

5. Hematology/Immunology/Oncology
   a. anemia
   b. Rh isoimmunization (erythroblastosis fetalis)
c. hemolytic disease of the newborn (ABO incompatibility)
d. transfusion therapy
e. coagulation disorders- disseminated intravascular coagulation, congenital clotting factor t thrombosis
6. Infectious diseases
   a. neonatal sepsis/meningitis
   b. nosocomial infections
   c. ophthalmia neonatorum

7. Neurology
   a. intraventricular/intracranial hemorrhage
   b. neonatal seizures
   c. hydrocephalus
   d. congenital anomalies, including neural tube defects

8. Orthopedics, including congenital hip dislocation

9. Renal/Fluids/Electrolytes
   a. acute renal failure
   b. dehydration

10. Respiratory diseases
    a. respiratory distress syndrome (hyaline membrane disease)
    b. meconium aspiration
    c. pneumothorax/barotrauma
    d. mechanical ventilation

11. Surgical
    a. chest
    b. abdomen- omphalocele
    c. abdomen- malrotation/mid-gut volvulus
    d. abdomen- meconium ileus
    e. genitourinary, testicular torsion
    f. genitourinary- cryptorchidism

12. Ears, Nose, and Throat

C. Acute Encounters-Children

1. Infectious diseases
   a. bacteremia & sepsis
   b. Central Nervous System infections- meningitis,
   c. Central Nervous System infections- encephalitis
   d. upper respiratory tract infections- nasopharyngitis (URI)
   e. upper respiratory tract infections- peritonsillar abscess
   f. upper respiratory tract infections- pharyngitisotitis media & externa
   g. upper respiratory tract infections- sinusitis
   h. upper respiratory tract infections- cervical lymphadenitis
   i. upper respiratory tract infections- laryngotraceobronchitis (croup)
   j. lower respiratory tract disease- pneumonia,
   k. lower respiratory tract disease-bronchiolitis,
   l. lower respiratory tract disease-pertussis,
   m. lower respiratory tract disease-tuberculosis
   n. lower respiratory tract disease-gastroenteritis (bacterial and viral)
   o. skin, soft tissue, and bone infections-cellulites
   p. skin, soft tissue, and bone infections-septic arthritis
   q. skin, soft tissue, and bone infections -osteomyelitis
   r. genitourinary infections, including cystitis andpyelonephritis
   s. streptococcal & staphylococcal diseases-scarlet fever
   t. streptococcal & staphylococcal diseases-rheumatic fever
   u. streptococcal & staphylococcal diseases-toxic shock syndrome
   v. streptococcal & staphylococcal diseases impetigo
   w. streptococcal & staphylococcal diseases staph scalded skin syndrome
   x. cardiac infection, including endocarditis
   y. ophthalmologic infections, including conjunctivitis
   z. other non-bacterial infections- measles
   aa. other non-bacterial infections- rubella
   bb. other non-bacterial infections- varicella
   cc. other non-bacterial infections- roseola
   dd. other non-bacterial infections- infectious mononucleosis
   ee. other non-bacterial infections- Rocky Mountain spotted fever
   ff. other non-bacterial infections- Lyme disease
2. Neurologic diseases
   a. febrile seizures
   b. encephalopathy (e.g., Reyes syndrome)

3. Respiratory and allergic diseases
   a. asthma
   b. aspiration pneumonia
   c. cystic fibrosis

4. Gastrointestinal diseases
   a. inflammatory bowel disease
   b. constipation
   c. milk intolerance

5. Urologic, Renal, and Metabolic diseases
   a. glomerulonephritis
   b. electrolyte disorders
   c. acid-base disorders
   d. nephrotic syndrome
   e. hypoglycemia, e.g., ketotic hypoglycemia

6. Dermatologic diseases

7. Surgical diseases
   a. pyloric stenosis
   b. appendicitis
   c. Meckel’s diverticulum
   d. hernia
   e. gastrointestinal obstruction

8. Cardiac diseases, including congestive heart failure

9. Hematologic diseases
   a. anemia
   b. neutropenia
   c. ITP
   d. hemophilia & Von Willebrand’s disease
   e. leukemia (including fever & neutropenia)

10. Rheumatologic diseases
    a. juvenile rheumatoid arthritis
    b. collagen vascular disease, e.g., SLE

11. Injuries and poisonings
    a. fractures, sprains, and strains
    b. burns
    c. lacerations, contusions, and abrasions
    d. foreign body ingestion
    e. corneal abrasion and foreign body in eye
f. epistaxis  
g. child abuse & sexual abuse  
h. toxic exposures (including lead, CO)  
i. head trauma  
j. animal bites  
k. food poisoning  
l. drowning and near drowning

D. Acute Encounters-Adolescents

1. Infectious disease  
   a. infectious mononucleosis  
   b. sexually transmitted disease

2. Cardiovascular disease, including syncope

3. Gastrointestinal disease

4. Diseases of water/electrolyte; Acid-Base

5. Skin diseases  
   a. acne  
   b. staph and strep skin infections- cellulites, lymphangitis

6. Endocrine diseases, i.e., diabetes mellitus

7. Injuries and poisonings  
   a. suicide attempt  
   b. rape  
   c. sexual abuse

8. Respiratory disease—asthma

9. Neurological diseases  
   a. Central Nervous System- seizures, meningitis  
   b. ophthalmmic

10. Hematologic  
    a. abnormal bruising  
    b. lymphadenopathy

11. Immunologic

12. Urologic diseases  
    a. testicular mass  
    b. urinary tract infection  
    c. hematuria

13. Musculoskeletal

E. Acute Encounters-Adults and Elders

1. Infectious disease  
   a. Central Nervous System-meningitis—bacterial, viral  
   b. Central Nervous System-brain abscess  
   c. Central Nervous System- encephalitis (esp. viral)  
   d. skin/connective tissue structures –cellulitis  
   e. skin/connective tissue structures – Zoster  
   f. skin/connective tissue structures- fasciitis/infectious gangrene  
   g. skin/connective tissue structures-Lyme disease  
   h. skin/connective tissue structures-septic arthritis  
   i. skin/connective tissue structures – osteomyelitis  
   j. respiratory system—bronchitis  
   k. respiratory system- pneumonia, e.g., TB, bacterial, viral  
   l. respiratory system- common cold—URI viral  
   m. respiratory system- empyema  
   n. cardiovascular system- endocarditis  
   o. cardiovascular system- pericarditis/myocarditis  
   p. cardiovascular system- infectious thrombophlebitis  
   q. gastrointestinal system- hepatitis  
   r. gastrointestinal system- gastroenteritis  
   s. gastrointestinal system- colitis  
   t. gastrointestinal system- cholecystitis
u. gastrointestinal system- appendicitis
v. renal system- pyelonephritis
w. renal system- cystitis
x. genitourinary system- genitourinary system
y. genitourinary system-vaginitis, cervicitis
z. genitourinary system-PID
aa. genitourinary system- Prostatitis
bb. genitourinary system- urethritis
c. sexually transmitted diseases-syphilis
d. sexually transmitted diseases-herpes
e. sexually transmitted diseases-gonorhea
ff. sexually transmitted diseases-Chlamydia
gg. sexually transmitted diseases-HIV
hh. parasitic
ii. systemic infections
jj. miscellaneous syndromes-approach to febrile patient/FUO, sepsis syndrome, infection in the compromised host

2. Hematology
   a. anemia- iron deficiency, pernicious
   b. disseminated intravascular coagulation
   c. immune thrombocytopenia
d. acute lymphoblastic leukemia
e. lymphoma
f. multiple myeloma
g. acute myeloid leukemia
h. sickle cell crisis
 i. neutropenic state

3. Neurologic
   a. cerebrovascular disease-stroke
   b. cerebrovascular disease-transient ischemic attack (TIA)
c. cerebrovascular disease-subarachnoid hemorrhage
d. seizures
e. acute alcohol-related problems- delirium tremens (DTs), seizures
f. neuromuscular diseases, including myasthenia gravis
g. evaluation of miscellaneous signs and symptoms- peripheral neuropathy
h. evaluation of miscellaneous signs and symptoms- evaluation of lumbar puncture results
   i. evaluation of miscellaneous signs and symptoms- coma
j. evaluation of miscellaneous signs and symptoms- increased intracranial pressure
k. evaluation of miscellaneous signs and symptoms- headaches

4. Cardiovascular
   a. rhythm disturbances- paroxysmal supraventricular tachycardia
   b. rhythm disturbances- sick sinus syndrome
c. rhythm disturbances- atrial flutter/fibrillation
d. rhythm disturbances- ventricular tachycardia
e. rhythm disturbances- sudden death
f. ischemic/cardiomyopathy- myocardial infarction/ischemia
g. ischemic/cardiomyopathy- myocardiitis
h. ischemic/cardiomyopathy- cardiomyopathy
i. ischemic/cardiomyopathy- acute pulmonary edema
j. aortic dissection
k. valvular disease- congenital and acquired

5. Respiratory
   a. obstructive pulmonary disease- chronic obstructive pulmonary disease
   b. obstructive pulmonary disease- asthma
c. restrictive lung disease neuromuscular/skeletal
d. restrictive lung disease interstitial
e. pulmonary embolism—deep venous thrombosis
f. pleural effusion
g. evaluation of miscellaneous signs and symptoms- hemoptysis
h. evaluation of miscellaneous signs and symptoms- cough
i. evaluation of miscellaneous signs and symptoms- dyspnea
j. evaluation of miscellaneous signs and symptoms- acute respiratory failure-hypoxemic, hypercarbic
6. Gastrointestinal diseases
   a. upper GI tract disease-peptic ulcer
   b. upper GI tract disease-gastric cancer—outlet obstruction
   c. upper GI tract disease-gastritis
   d. evaluation of upper GI bleeding
   e. lower GI tract disease - inflammatory bowel-Crohn’s, ulcerative colitis
   f. lower GI tract disease- evaluation of lower GI bleeding
   g. liver, gall bladder, bile ducts, pancreas- acute hepatitis,
   h. liver, gall bladder, bile ducts, pancreas- cholelithiasis, cholecystitis,
   i. liver, gall bladder, bile ducts, pancreas- pancreatitis

7. Reproductive diseases
   a. ovarian cyst
   b. vaginitis
   c. pelvic inflammatory disease (PID)
   d. amenorrhea
   e. menorrhagia
8. Urologic diseases
   a. renal/ureteral disorders-hydronephrosis, calculi
   b. bladder disorders, including cystitis
   c. urethral/penile disorders, including urethritis
   e. prostate disorders – prostatitis
   f. prostate disorders - benign prostatic hypertrophy
   g. prostate disorders - prostate cancer
   e. scrotal disorders, including inguinal hernia
   f. symptoms and signs, incontinence, hematuria, dysuria, symptoms BPH

9. Skin disorders, including drug reactions

10. Musculoskeletal/Connective Tissue disorders
   a. arthritis- osteoarthritis
   b. arthritis - rheumatoid
   c. arthritis – infectious
   d. arthritis -with collagen vascular disease
   c. trauma/overuse syndromes- bone fractures, e.g., elderly fractured hip
   d. trauma/overuse syndromes- sprains & strains
   e. trauma/overuse syndromes- herniated disk
   c. connective tissue disorders, including systemic lupus erythematosus (SLE)
   d. tumor
   e. infections—osteomyelitis

11. Endocrine diseases
   a. hypothalamic disorders
   b. hypothalamic disorders – hypopituitarism
   c. hypothalamic disorders - syndrome of inappropriate anti-diuretic hormone secretion (SIADH)
   d. hypothalamic disorders - diabetes insipidus (DI)
   e. thyroid disorders- hypothyroidism—myxedema coma
   f. thyroid disorders- hyperthyroidism-thyroid storm, Grave’s disease
   g. adrenal disorders, Cushing’s syndrome, adrenal insufficiency, pheochromytoma
   h. disorders of mineral metabolism- hypercalcemia- primary hyperparathyroidism, other causes, hypocalcemia
   i. disorders of mineral metabolism hyper- and hypokalemia
   j. disorders of mineral metabolism hyper- and hyponatremia
   k. disorders of fuel metabolism- hyperglycemia- diabetes mellitus, hyperosmolar coma
   l. disorders of fuel metabolism hypoglycemia
m. paraneoplastic syndromes

12. Injuries and poisoning
   a. poisoning- acetaminophen
   b. poisoning- opiates
   c. poisoning- tricyclics
   d. poisoning- organophosphates
   e. poisoning- carbon monoxide
   f. poisoning- aspirin
   g. injuries- fractures and sprains
   h. injuries- first and second degree burns
   i. injuries hypo- and hyperthermia
   j. injuries bites and stings- bee sting allergy (hymenoptera)
   k. injuries- smoke inhalation

F. Emergency Encounters-Fetus/Neonate
   1. Cardiac arrest
   2. Respiratory distress—apnea
   3. Cyanosis
   4. Decreased responsiveness—lethargy
   5. Fever
   6. Rash
   7. Seizures
   8. Bleeding (generalized)
   9. Jaundice
   10. Pallor
   11. Edema
   12. Vomiting/Abdominal distension

G. Emergency Encounters-Pregnancy/Labor & Delivery
   1. Maternal complications
      a. bleeding
      b. abdominal pain
      c. respiratory distress
      d. fever
      e. seizure
      f. hypertension
      g. edema
      h. hypotension/shock
   2. Fetal/Neonatal complications
      a. fetal distress
      b. neonatal resuscitation
   3. Complications of labor & delivery
      a. preterm labor/delivery
      b. precipitous delivery

H. Emergency Encounters-Infancy and Childhood
   1. Cardiac arrest
   2. Respiratory distress—apnea
   3. Altered mental status
   4. Coma
   5. Fever
   6. Rash/petechiae
   7. Seizure
   8. Trauma
      a. major
      b. minor
   9. Bleeding
a. generalized  
b. localized  
10. Hypotension/Shock  
11. Hypertension  
12. Peripheral edema  
13. Abdominal pain  
14. Headache  
15. Vomiting/Diarrhea/Dehydration  
16. Poisoning/Ingestions  
17. Jaundice  
18. Scrotal pain/Swelling  
19. Anaphylaxis  
20. Cough  
21. Syncope  
22. Drowning  
23. Stridor  

I. Emergency Encounters-Adolescence  
1. Cardiac arrest  
2. Respiratory distress—apnea  
3. Altered mental status  
4. Coma  
5. Fever  
6. Rash/petechiae  
7. Seizure  
8. Trauma  
   a. major  
   b. minor  
9. Bleeding  
   a. generalized  
   b. localized  
10. Hypotension/Shock  
11. Hypertension  
12. Abdominal pain  
13. Headache  
14. Vomiting/Diarrhea/Dehydration  
15. Poisoning/Ingestions  
16. Jaundice  
17. Arthritis/Arthralgia  
18. Scrotal pain/Swelling  
19. Anaphylaxis  
20. Cough  
21. Syncope  
22. Drowning  
23. Eye pain/Visual changes
24. Suicide attempts/Ideation
25. Chest pain

J. Emergency Encounter-Adults
1. Cardiac arrest
2. Respiratory distress—apnea
3. Altered mental status
4. Coma
5. Fever
6. Rash/petechiae
7. Seizure
8. Trauma
   a. major
   b. minor
9. Bleeding
   a. generalized
   b. localized
10. Hypotension/Shock
11. Hypertension
12. Peripheral edema
13. Abdominal pain
14. Headache
15. Vomiting/Diarrhea/Dehydration
16. Poisoning/Ingestions
17. Jaundice
18. Scrotal pain/Swelling
19. Anaphylaxis
20. Cough
21. Syncope
22. Back pain (upper and lower)
23. Eye pain/Visual changes
24. Palpitations
25. Suicide attempts/Ideation
26. Chest pain
27. Fatigue/Weakness/Dizziness
28. Focal neurologic defects
29. Pain in the extremities

K. Emergency Encounters-Elders (see entire Adults section)
30. Falls
31. Incontinence
L. Chronic Encounters General principles and concepts

1. Epidemiology (incidence & prevalence)
2. Risk factors
3. Public health impact
4. Social, cultural, and economic impact
5. Etiology and pathogenesis
6. Pathophysiology
7. Genetics
8. Symptoms
9. Function
   a. physical
   b. mental/affective
   c. social
10. Lifestyle
    a. diet, exercise, and body image
    b. sex, reproductive
    c. smoking, alcohol, and drugs
    d. financial
11. Health perception of quality of life
12. Ethical issues (e.g., advance directives)
13. Physical examination findings
14. Laboratory
    a. issues of accuracy, cost, and utility
    b. screening tests
    c. diagnostic tests
    d. monitoring tests
15. Management
    a. patient education
    b. adherence
    c. acute complications
    d. iatrogenic complications
    e. chronic complications, prevention, restorative treatment, rehabilitation
    f. pharmacological
    g. nonpharmacological, e.g., diet, exercise
    h. special situations, e.g., pregnancy, adolescence, elders
16. New developments and emerging concepts
17. Systems of care

M. Chronic Encounters-Specific diseases

1. Infancy, Childhood, and Adolescence
   a. cerebral palsy
   b. mental retardation/learning disorders
   c. cystic fibrosis
   d. sickle cell anemia
   e. child abuse
   f. cancer/leukemia
   g. seizure disorders
N. Chronic Encounters - Adult
   a. hypertension
   b. coronary artery disease
   c. heart failure
   d. pulmonary diseases – emphysema
   e. pulmonary diseases - chronic bronchitis
   f. pulmonary diseases - asthma
   g. gastrointestinal - dyspepsia
   h. gastrointestinal - peptic ulcer
   i. heart failure
   j. several cancers
   k. AIDS
   l. stroke
   m. neurologic disorders- Parkinson’s, multiple sclerosis, amyotrophic lateral sclerosis (ALS)

O. Chronic Encounters - Elders
   a. dementia/delirium
   b. osteopenia/management of menopause
   c. immobility and complication (pressure sores)
   d. incontinence
   e. falls/fractures
   f. normal aging
   g. hearing and vision impairment
   h. malnutrition
   i. pharmacology- adverse drug reactions, drug interactions

P. Behavioral Encounters- Neonates/infants
   1. Colic
   2. Sleep problems
   3. Feeding problems
   4. Failure to thrive

Q. Behavioral Encounters- Children
   1. Depression
   2. Attention deficit disorder
   3. Developmental disorders
   4. Anxiety disorders, including separation anxiety
   5. Tic disorders

R. Behavioral Encounters- Adolescents
   1. Depression
   2. Psychoactive substance abuse or dependence
   3. Suicide
   4. Eating disorders
      a. anorexia nervosa
      b. bulimia nervosa
   5. Schizophrenia
   6. Brief reactive psychosis
   7. Anxiety disorders, including post-traumatic stress disorder (PTSD)
S. Behavioral Encounters- Adults

1. Mood disorders
   a. bipolar disorder
   b. depressive disorders

2. Psychoactive substance abuse and dependence

3. Anxiety disorders
   a. PTSD
   b. phobias
   c. panic disorder
   d. obsessive compulsive disorders
   e. generalized anxiety disorder

4. Somatoform disorders
   a. somatoform pain disorder
   b. somatization disorder

5. Sexual dysfunction

6. Schizophrenia and other psychoses

7. Adjustment disorders

8. Sleep disorders

9. Organic mental disorders
   a. dementia
   b. delirium
   c. organic affective disorder
   d. organic anxiety disorder
   e. organic personality disorder
   f. organic delusional disorder
   g. organic hallucinosis

10. Eating disorders
    a. anorexia nervosa
    b. bulimia nervosa

T. Behavioral Encounters- Elders

1. Mood disorder
   a. bipolar disorder
   b. depressive disorder

2. Psychoactive substance abuse and dependence

3. Anxiety disorders
   a. PTSD
   b. panic disorder
4. Somatoform disorders
   a. somatoform pain disorder
   b. hypochondriasis
   c. somatization disorder
5. Sexual dysfunction
6. Schizophrenia and other psychoses
7. Adjustment disorders
8. Sleep disorders
9. Organic mental disorders
   a. dementia
   b. delirium
   c. organic affective disorder
   d. organic anxiety disorder
   e. organic personality disorder
   f. organic delusional disorder
   g. organic hallucinosis
10. Delusional disorders